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The Psychologist and His Science[1]

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GENTLEMEN,

I feel myself highly honoured by being called upon to preside over the deliberations of the Psychological Section so soon after its foundation. Quite in the fitness of things, my predecessor in this office was Dr. N. N. Sengupta who had the honour of starting the first regular Psychological Laboratory in India. I simply carried the torch I lighted at Calcutta, to Dacca which now claims to have the second Laboratory in India. I have no doubt that in the near future it will be recognised all over India, as it has already been recognised in many countries of the West, that for the proper study of Psychology, as for the study of Physics and Chemistry, a Laboratory is an indispensable adjunct in every College and every University.

While we are discussing the spread of this new branch of learning, let us not forget to pay our tribute of respect to the memory of Sir Asutosh Mookerjee, to whom we owe not only the founding of the first laboratory of Experimental Psychology in India but also the starting of this Psychology Section.

[1] Presidential address to the Psychology Section of the Indian Science Congress, Bombay, 1926.

Before he came forward to champion the cause of this science, the voices of Dr. Sengupta and myself were as voices in the wilderness. We were offered by the authorities of the Congress a half-section and asked to combine with Anthropology to form one section, as Physics and Mathematics are still doing. But we had faith in the importance of our subject and we did not want to embarrass either the anthropologists or ourselves by this unnatural alliance. It is just likely that our training in philosophy made us draw a clear distinction between Anthropology and Psychology, as has been done, for instance, by Hegel in his "Philosophy of the Spirit," and the very generous response we received last year from all over India to our late invitation for papers confirmed us in the belief that the section would not at any time languish for want of materials. It is up to you now to feed this section year after year so that it might not be said that the science we profess has no devout votaries in considerable numbers and should not have been granted an independent section in the Congress.

But while we complain against the temporary injustice done to our science we must not forget that the British Association, on which model this Science Congress was founded, took a much longer time to recognise the claims of Psychology and Education. We may congratulate ourselves that we had less trouble than our fellow-workers in the West to get into the Science Congress. The psychologist is indeed in a difficult predicament nowadays. He is now an outcaste among philosophers for daring to deny that the science of mind is primarily meant to strengthen a belief in the substantiality and eternity of the soul. The rationalistic approach is no longer an article of faith with any psychologist as such, although it is open to him to have a philosophy in addition to a psychology, as the cases of Wundt, Münsterberg, McDougall, Ward and others show. It is the phenomenology of the mind that is his primary concern and, as

such, his method of approach is identical with that of the natural scientist, although the materials are of a new order and the instrument of exploration is different. It would have been illogical indeed if the scientists had refused to bring psychology within the fold of natural science. From the time of Greek speculation onwards the materialists (who championed the cause of natural science) had been telling us that mind was of the same order as matter. La Mettrie, Holbach, Vogt, Spencer and a whole host of them reiterated that mind was of the same order as life and that life was evolved out of matter. What prevents then the scientists to acclaim the psychologist as their kinsman? It must be admitted therefore that, inspite of their faith that matter and energy are the root of all creation, the scientists have not been able to get entirely over the vague feeling that probably mind is something different from matter and that with such an impalpable being it is better not to have any thing to do. And they have hitherto been fortified in this belief by the fact that the psychologists of the past were also philosophers, and, naturally, where speculation reigns supreme, observation and experiment have no place. The new school of psychologists that has arisen can however claim that it has nothing to do with speculation or philosophy and that it studies mind much in the same way as the natural scientist studies matter. I do not want to go into the vexed question of the necessity of alliance between Philosophy and Psychology, for what I might say would probably be in favour of the alliance, and then I would be accused of a bias in favour of philosophy in which I had the major part of my training. It is almost certain that future Presidents of this section will be less philosophically inclined than my predecessor and myself, whom a Calcutta paper once felicitously described as the missing links between philosophy and psychology. Perhaps it would be for the benefit of psychology as a science that its workers should possess as little as

possible of the speculative tendency. But before psychology takes final leave of philosophy let it acknowledge with gratitude that Introspective Psychology owes a heavy debt to philosophers for all that they did to spread its domain among the laity and the professionals alike.

But while it is easy to say that psychology is not philosophy it is more difficult to say exactly what it is. To say that it is the science of mind is not to solve the problem at all till we know what mind is. Did not the rationalists think that mind and soul were closely related entities? In the hands of Hume and latter-day psychologists mind was limited to the states and processes of thinking without reference to any underlying principle. Modern psychologists have gone beyond this standpoint in two ways. We have now a new conception of mind according to which the unconscious plays a great part in the determination of conscious attitudes. We have now advanced a good deal beyond the theories of mind-stuff as advocated by Spencer and Clifford or the theory of apperception-mass as advocated by Herbart. The atomistic conceptions are as surely out of place nowadays in the realm of mind as they are in the realm of matter. We are now in search of a dynamic principle of thought and are trying to discover whether after all mind could not be defined in terms of reaction to natural and social surroundings. The biologists, beginning with Spencer, raised the question as to whether mind could not be regarded as the prolongation of vital reaction, and now the neo-realists in Philosophy and the behaviourists in Psychology are joining the older instrumentalists like Dewey and the neo-vitalists like Bergson in the view that mind is only a cross-section of reality and understandable only as a mode of reaction of the organism to its complex situations. These thinkers do not go so far as the older materialists who regarded the brain as secreting thought just as the liver secretes bile; but there is at the same time a definitely outward directed look in explaining mental

phenomena. This changed attitude is probably a reaction against the extravagance of introspective analysis to which older psychology confined itself: it may also be due to a greater knowledge of the potentialities of life, which an increased acquaintance with vital phenomena has brought about. The doctrine of Evolution which, inspite of a few reactionaries, is the creed of the majority of philosophers and scientists, refused to treat the mind as an entirely novel creation, and even though Wallace continued the Cartesian tradition of a rational soul, the trend of Darwinism was to deny that nature created the lungs but God created the brain. Comparative psychology, again, tried to establish the similarity between human and animal reactions in many matters and tended to reduce their popularly accepted distinction in kind to a distinction in degree only. In other words, the description of man as slightly lower than angels was changed to that of man as a glorified animal.

Meanwhile philosophy had been preparing the way for a changed outlook. The old Aristotelian Logic had defined man as a rational animal. The Churchmen were interested in the rational aspect and told people that man was distinguished from other animals by his rational behaviour in all matters, that while animals were guided by instinct man was guided by reason. Even when the dualism of body and mind obtruded itself uncomfortably upon men's attention, a compromise was effected by saying that while the body of man was a machine his mind was a spark from divinity and, as such, he must render unto Caesar what was Caesar's and unto God what was God's. Theories had to be propounded as to how such a household divided against itself could stand and various speculations were advanced as to how the soul and the body were related and how they could come into relation with each other. Materialism, Dualism, Spiritualism, Panpsychism and a host of similar creeds were put forward as solutions of this vexed problem. While such

was the situation in the philosophical world the psychologists thought it wise to ignore speculations altogether and quietly pursue a positive study of mental facts.

The rise of the Association School in England is therefore of such historical importance in the development of Psychology. The tradition of empiricism in English Philosophy kept speculation within proper bounds, and Hamilton, Brown, James Mill, John Stuart Mill, Bain and Spencer carried on the work of Hartley and Priestley according to their own light and did not allow Psychology to be clogged by too much philosophical speculation. These writers, whether as philosophers or as psychologists, gave excellent analyses of mental facts, and though modern psychology has travelled far away from the standpoint of these writers, the days of Analytical Psychology are not entirely over, as the work of Stout shows. It is not in respect of the data that modern psychology differs from older psychology—it is the method of interpretation that has profoundly varied. Modern writers have discovered more profound associations than those discussed by Association Psychology and have attempted to solve more satisfactorily the preferential groupings of mental elements in individual lives. Associationism, again, was born under the influence of Idealistic traditions; but modern psychology has had the advantage of being backed by a Realistic revival in Philosophy. In the new dispensation of things equal justice has been sought to be given to both mind and matter. Wundt, James, Holt, Russell, Alexander and, in fact, almost all realistic writers of note have attempted to do justice to Matter in their theory of reality with the effect that Consciousness is no longer regarded as having any prerogative position in reality. The development of the concept of Mind is now as much a problem as the development of the idea of Matter. We no longer take mind for granted in psychology. Biology has insisted from the very beginning that Mind should be regarded as a

problem and now Realism has seconded the demand. So the task of the psychologist has enormously increased and the complacent occupation of self-analysis without reference to the biological background of mind has come to an end. It is no longer possible to be a good psychologist without being tolerably acquainted with broad biological and physiological facts.

If any other point in this connection needs notice it is the rise of individualistic psychology. Ward had indeed described the standpoint of psychology as individualistic; but when he wrote, the word had an entirely different connotation. By 'individualistic' Ward meant to convey the fact that only one mind was accessible to direct observation, namely, the mind of the introspecting subject. All other minds were indirectly known, *viz.*, by interpreting the bodily signs of those others on the analogy of our own expressions. By 'expressions' at that time were meant the broad visible features of bodily movements,—the flush of face in anger and shame, the shaking of the body in rage and terror and such other phenomena which did not require any delicate instrument to detect and measure. It was the surface excitations that were then considered as the only indices open to observation and the only data available for constructing an idea of other minds. The New Psychology has not abandoned the salutary check which these introspective psychologists imposed on their speculation regarding other minds and has not bidden for the honour of being the science of psychical research as well. The body is still the medium of communication between mind and mind; but if one wants to appraise the distinction of the old and the new, one need only read the works of Spencer and Cannon on the Language of the Emotions to have an idea of the development of our knowledge regarding the bodily concomitants of mental states. Our instruments for detecting the number and amount of bodily changes are gradually becoming more and more refined. The

automatograph, the cardiograph, the pneumograph, the sphygmograph and the plethysmograph, which were the pride of the age just over, are being slowly replaced by other instruments that are meant to gauge the chemical changes in the body in different states of the mind, specially of an affective kind. The dubious significance of bodily expressions is being confined within gradually decreasing limits, and slowly the data are being taken out of the control of the subject and put on an objective basis. Simulation is rendered more and more difficult as subtle bodily changes are made the bases of interpretation. Incidentally, it is being proved that inspite of its ethereal nature the mind is not without its feet of clay and that it is within the competence of the psychologist to diagnose mind by noting the subtle changes that the body undergoes during thought. Behaviourism may be extravagant in its claims but it has put the finger on the right spot in its diagnosis of mind.

I am treating this point at some length for it is not generally admitted by the psychologists of the older school that the body is at the root of mind in a more real sense than they imagine. This refusal partly arose no doubt from an ignorance of the potentialities of the body itself. With a few notable exceptions most of the psychologists had a vague general idea that the brain was the seat of the mind (if mind had any seat at all), that the size and number of convolutions of the brain had something to do with intelligence, and that the evolution of higher forms was attended by the growth of a more complex nervous system. Latterly, phrenology introduced a fantastic theory of localisation, and when this pseudo-science was dethroned the localisation of simple functions was as rigidly conceived for some time and retarded the growth of our knowledge regarding the possibilities of the bodily organism. The fact is that anthropology and comparative physiology had a tendency to over-emphasise the broad distinctions of anatomical and biological features. It is when

inter-specific distinctions are noted in respect of men that the finer shades of difference come into view; and in order to study the potentialities of the organism the same body is to be examined in its various forms of existence at different times. For this, clinical materials are wanted and also a deeper knowledge of the body than what the older physiologists and psychologists possessed. The anthropologists whom they could consult could only tell them that there were typical distinctions between race and race, between the Bushman and the Caucasian; but when it came to explanation they had no satisfactory theory to offer. Even now prehistoric brains are being excavated and their cranial features religiously noted and their cephalic indices measured; but we are almost as far from any satisfactory explanation now as before. This mystery of human development, though less profound than the mystery of the evolution of species, is standing in the way of a more comprehensive knowledge of the origin of mental functions and of the development of intelligence in general. But there is the outstanding fact that in the struggle for existence the more primitive races, inspite of the artificial care bestowed on their preservation, are being gradually exterminated because they fail to adjust themselves to the changed social surroundings for which they have not the adequate organic outfit and are not developing any. What is at the root of this mental inability of the savage? The negro, whose chromosomal constitution is perhaps different from that of most other races, has shown his capacity to orient himself to the altered conditions of life; but the primitive inhabitants of Ceylon, Australia and the Andamans are unable to come up to the minimum requirements of modern life and are dying out. What is at the root of this—the body or the mind? It is as much a problem for psychologists as for anthropologists. If it can be proved that the body is at the basis of this inability and that the savage brain lacks those elements that enable the organism to develop new chemicals in keeping with the changed

surroundings and thereby to keep pace with new needs, physical and mental, we shall have proved to some extent that the body is of primary importance in psychical matters. But that knowledge we do not have at present to the extent desired, although the indications are that, inspite of gross similarity, the subtle features of primitive man are unlike as compared with those of more advanced races. Whosoever has any knowledge of biology knows that nature can play a hundred themes on the same pattern, and he would be a bold man indeed who would say that because the savage and the civilised look alike, therefore they are practically identical in their powers and potentialities. Inspite of its unpalatableness in the realm of politics, we are gradually coming to recognise that racial traits are not myths and that the bodily constitution has much to do with our mental equipment, especially regarding our affective and volitional endowment. It is not our business just now to prove how differential equipment might arise in the offshoots of the same race, but the fact remains true all the same that all traits are not acquired in course of a single life-history. Social environment remaining the same, very different results are obtained from people of different races, and for an explanation of this discrepancy in the result we are compelled in the last resort to invoke the aid of differential organic constitution. So, in order to build up a science of mind, we are at the very outset met by this preliminary difficulty that, after all, our generalisations might be true of one type of constitution and not of another. Psychology finds that it is hampered in its operations by this bodily limitation and comes to recognise very forcibly the old scholastic standpoint that matter is the principium individuationis, not only of the person but also of the race. If the East cannot understand the West or the West the East, if the Whites cannot understand the psychology of the coloured races or *vice versa*, something is due to the bodily limitations, although much also may be due to interested obtuseness. The knacks

of social and conventional life are easily learnt and also matters that are primarily intellectual; but temperamental reactions and habits of will we owe more to racial heredity than to individual learning and these ultimately fix our type.

It did not escape the most casual of all observers that the temperamental outfit of man and that of woman differed very much from each other. It was also a matter of common knowledge that each period of life had its characteristic outlook upon life. The child, the youth, the adult, the middle-aged and the old have each his own psychology, and so also the man and the woman. It is only in the present century that we are just beginning to know that these distinctions, as well as those of race, are probably due to the same cause. Although this knowledge has not yet been wholly put to practical use and may not be so at any time completely, we are on the threshold of great discoveries regarding the evolution of species in general and of racial and character types in particular. The suggestion of Osborn that very probably the evolution of species was due to the functioning of different types of enzymes or hormones has been repeated by Keith in respect of racial types, and we are at present nearer than ever before a satisfactory knowledge not only of racial and individual features of the body but also of the mental compositions of men. This is due to the shifting of the centre of physiological interest from the nervous system to the glandular system in living beings. In a far more subtle way than the nervous system, this glandular system brings about a chemical correlation of the various parts of the organism and determines not only our anatomy and physiology but also our mentality and instinctive reactions. Not only the instinctive actions but also the emotions, as also will, imagination and thought are now supposed to be profoundly affected by our glandular constitution, and what the changes due to age and sex show is a small part of the whole history. The revelation is disquieting to an academic

psychologist who is loth to admit that in mental matters any thing bodily should have any great share, and in proportion as he is unacquainted with the facts of life he will be disposed to view the increase of biological knowledge as the encroachment of materialism upon a spiritualistic dominion. He may be somehow persuaded to believe in the efficacy of the nervous system in mental matters; for it so happens that, unlike other systems in the body, this system has attained a certain amount of independence of temporary bodily conditions and is not liable to be so much affected by a passing change in the constitution of the blood as the other systems. But the uncomfortable truth is dawning upon him that the nervous system is not so immune to influences as the older physiologists thought and that, far below the limits of visibility, unseen forces are at work to give a twist to its functions. Thus while the train of thought is in motion the chemical constitution of the organism is shunting it on from line to line, and because the train never stops we are under the impression that nothing has altered its course.

That the nervous system is still one of our main aids in explaining mental facts is beyond doubt, but the religious attitude towards it assumed by some physiologists and psychologists is no longer justifiable. The reaction has come from two sources. There is, first, the fact that within certain very wide limits the nervous system is capable of carrying on its functions. There is no doubt restitution of functions, but there is vicarious functioning also, and in certain lower forms the lower brain is capable of taking up some of the functions of the higher. There are again undoubted cases of extensive brain-lesions without any appreciable effect upon the mental functioning. Some compensatory function somewhere was making up all the time for the lost portions and giving the individual all the outward symptoms of normal life. Thus for mental function the nervous system need not be of a stereo-typed character—it can discharge its integrating

function even in the absence of some proper parts. There is, secondly, the fact that the systems, once ignored in the explanation of mental phenomena, are gradually coming to their own. The sympathetic system, once regarded as an appendage to the nervous system, is now known to discharge important functions in the economy of our bodily and mental life. Not only does it control the vegetative system but through that system it controls the mind indirectly and keeps up that tonicity of the organism without which the nervous system cannot act properly. The nervous system, therefore, acts more or less as the culminating phase of a complicated system of checks and drives, the roots of which are embedded in the other systems so long neglected by the physiologists. The failure to recognise this fact was the cause of some mistakes that still persist in ordinary text-books. Thus the doctrine of Local Sign, advocated first by Lotze and since then the common property of psychologists, takes the phenomenon of localisation as due to the psychic correlate of stimulation, while the fact is that the organism without a brain is equally capable of localising stimuli by appropriate reflex action as has been proved by experiments on scratch-reflex on decerebrised dogs. The flow of pancreatic juice, originally ascribed to nervous action by Pavlov and rendered doubtful as due to nervous action by Popielski, has been proved to be due to secretin, a material derived from the intestinal mucous membrane, that is carried to the pancreas by way of the blood stream. Thus, for psychical and purely physiological functions, the importance originally ascribed to the nervous system is being brought within proper dimensions.

I am tarrying so long over this point because in recent psychology and philosophy there is a tendency to regard the intellect as an instrument of adjustment evolved by the organism to meet its situations and not a God-given faculty to differentiate man from the brute creation. If then man's

rationality is not absolute but relative to the organism, it behoves us to find out what exactly that organism is. If the Pragmatists are right in holding that the intellect is only a hand-maid of the passional and volitional nature, then all the factors that determine that nature have necessarily to be considered when we want to understand the function of the intellect in any given case. The older theory that memory is the basis of personality is being replaced by the theory that not intellectual, but affective and volitional, factors are the true bases of personality, and these Wundt and James were disposed to regard as, in the last resort, so many organic sensations. We have outgrown the conception of 'organic' as in Wundt and James, but we are gradually coming to recognise, more deeply than these writers imagined, the truth of their views that the basis of personality is not the nervous functions alone but in a truer sense the glandular functions that are ultimately responsible for our temperament and tendency. Thus, the thyroxin, whose accelerating function has been proved not only in the cases of axolotls and tadpoles but also in the case of defective growth in man, not only regulates the differentiation of tissues and the general growth of the body but also prevents the cretinism of the intellect by preventing infantilism and the wanton onesidedness of moods which hyperthyroidism and hypothyroidism are bound to produce. Berman puts the matter in this extravagant language: "Without thyroid there can be no complexity of thought, no learning, no education, no habit-formation, no responsive energy for situations, as well as no physical unfolding of faculty and function, and no reproduction of kind, with no sign of adolescence at the expected age, and no exhibition of sex-tendencies thereafter." The parathyroids, again, that regulate the amount of lime in the blood and cells, are also responsible for the steadiness of muscles and nerves. When they are removed the nerves become extremely excitable and the reflexes are over-sensitised. The patient

is seized with nervousness, restlessness, insomnia and tremor if there is a deficiency of parathyroidal secretion. The Thyroid and the Parathyroid together, therefore, are at the root of our thought and action, and any deficiency in either is bound to warp our normal reaction to reality and give an entirely false outlook upon life. It is not with a mind diseased that we have to deal in such cases but with a body lacking in iodine and lime, and the treatment is not instruction but injection.

Take, again, the other endocrine organs. The pituitary, which consists of two parts, affects the growth of the body, specially the skeletal frame and the supporting tissues, by means of the anterior part, and the function of the accessories of the nervous system, *viz.*, the brain and nerve cells, the plain muscles and the contractile organs in general, by means of the posterior part. Pituitrin, the active substance of the posterior part, not only regulates the amount of salt in the blood but is also responsible for regulating the bodily temperature and the organic rhythm of waking and sleep, diurnal and seasonal, and also for stimulating sexual activity. The overactivity of the pituitary produces not only the frame of a giant but also increased mental power and capacity of substained work. A cramped pituitary is responsible for a cramped intellect and will and is the mother of obsessions and compulsions and lack of moral control. There is probably some relation between the thyroid and the pituitary, as Luciani, following Rogowitsch, points out, and probably each can to some extent function vicariously for the other. But if hypophysectomy is followed by great depression and complete apathy, making an animal indifferent alike to caresses and ill-treatment, and also by great motor disturbances, we can probably infer what the normal function of the hypophysis is in the economy of normal life. If to this is added deficiency of thyroid secretion which is followed by the blunting of mental functions, such as the loss of memory, deafness,

taciturnity, melancholia, self-absorption, and even occasional unconsciousness, we can well understand what it is to be without the necessary equipment of these secretions and what personality we are likely to develop.

But the glands that have become the object of a more systematic research in recent physiological and psychological literature are the adrenal glands. The cortices of the glands are derived out of the germinal epithelium and are intimately associated with sex-characters and also with brain-development. Any interference with their normal functioning alters the whole outlook upon life which is peculiar to a particular sex, producing virilism in women and effiminacy in men. Any disproportion between the cortex and the medulla of an adrenal gland affects the growth of brain-cells and thereby the capacity of thought in the last resort. The interior portion of the gland, called the medulla, has been the subject of classic experiments by Cannon in connection with the emotions of rage and fear and with pain. Its secretion, the adrenin or adrenalin, is caused by deep emotion and, when artificially injected into the blood stream, produces the organic changes peculiar to pains and emotions. We are just now concerned with the second part of the above statement, *viz.*, the effect of the secretion upon changes directly related to the emotions. If there be any truth in the theory of James and Lange (especially of the latter), we can see what it means to have the manifestations of the bodily states artificially produced by the injection of adrenin into the system. The somatic resonance is accompanied by the corresponding mental states, whether as effects, as James supposed, or as concomitants, as Ribot supposed, and the mental attitude will be altered by the changed condition of the blood-stream. If, as has been claimed by some, the nature of a dream can also be similarly modified by injecting adrenalin, then it is evident that the unconscious of the Freudian literature will have to be considerably widened in its

denotation so as to include not only the subconscious or foreconscious or co-conscious mental states, but also the purely physiological states of the body induced by the introduction of chemicals. It is immaterial whether the chemicals induce certain brain-changes and these in their turn stimulate certain centres of thought and thereby bring about the intellectual and affective (*e.g.*, euphoric or melancholic) states in question. The fact remains that for the production of certain types of thought we are not absolutely dependent upon chance or upon purely mental factors; the body in all its subtle transformations remains the abiding back-ground of all thinking and feeling.

While we are on the subject, let us forget that the demands of modern civilised life are so many and so insistent that unless there is an adequate supply of the adrenalin from the glands there is bound to be nurasthenia or nervous breakdown. It is the adrenal glands that supply the necessary energy for withstanding the storms and stresses of life. A want of adequate supply leads to lassitude and sense of inefficiency in mental and muscular matters. Langley and Elliott have shown that in the sympathetic system the adrenalin acts on the end-organs that unite the nerve fibres with the substance of the muscles; and it is not unlikely that its effects on the voluntary muscles are of a similar nature. Its effect on the blood-pressure is also in favour of the supposition that it has something to do with the mobilisation of energy in the system; it "raises the tone of the vasomotor, respiratory and cardiac centres, as well as the centres for muscular tone."

Passing over the pineal and the thymus which have to do with retardation of premature masculinity and mental outlook of the adolescent, we may mention the gonads, the sexglands, which have come in for a certain amount of publicity in connection with the rejuvenation experiments of Veronoff. The interstitial glands of the testes and the ovaries

have been proved to have important functions, both by castration and by transplantation. They are at the root of our secondary sex-characters and control the whole apparatus that determines our peculiar reaction to environment according to sex. Darwin first drew attention to the remarkable susceptibility of the sex instinct to a change in the environment by pointing out the difficulty of inducing certain types of animals to breed in captivity. He was also the first to draw attention to the rôle of sexual selection in the origin and preservation of species. Weismann tried to establish the early segregation of the germ-cells in order to establish his theory of germinal variation. But it is only in recent times that we are in a position to assert with confidence why castration and shrinking of the interstitial cells in old age have a similar effect on the body and mind—why, for instance, social service work which requires a certain amount of detachment from the cares of family life is mainly an affair of middle-aged women and not of young girls. It is not because the girls are lacking in kindness and altruistic impulses but because the energy for that kind of work is not available owing to the activity of other glands of reproduction. Widows, old maids, sterile women and women approaching the climacterium are the best social workers, not only because they have more time but also because they command the necessary energy for the purpose. The effect of the sex glands upon mental outlook is not a new discovery. Hysteria connected with approaching womanhood (especially when the sex instinct is imperfectly satisfied), insanities of pregnancy and puerperium, the suspicion, jealousy, and insanity at the time of the menopause have been made familiar to us by writers on abnormal mentality, *e.g.*, by Mercier. That at every crisis of the sexual life we undergo a certain amount of transformation in our bodily and mental equipment is such a familiar event that it is likely to be overlooked. If Freud has drawn attention to that fact alone, he deserves our best

thanks, whether his theory of the polymorphous perversity of childhood and the sexual etiology of dreams and other mental states (*e.g.*, religion) may or may not be acceptable to us in their entirety.

Where then do we stand ? We have found that at the basis of our individual personalities there are certain glandular factors once overlooked, and that our racial, familial, sexual and temperamental constitution owes a deep debt to the bodily factors. If then we find that psychologically we are not the same, we must apportion the cause thereof impartially to the body and the mind alike, and must not run away with the notion that when the education and opportunities of the individual are duly noted we have the whole cue to the personality. What constitution can do we know from the mentality of identical twins and what training does we know from experiments on familial constellation (though there also constitution has a great influence). No less than the biologist, the psychologist is faced with the questions of heredity and variation, and he has in addition to take note not only of the physical but also of the social environment, and also to discuss the transmission of mental traits, which is harder to detect than the transmission of bodily characters. It is not easy to say how far mental traits mendelise. The formula of progressive diminution is all right for class work, but when it comes to actual practice we find that all are not able to say like Goethe from what parent they got what character.

Thorndike has tried to enumerate some of the factors that determine the character of an individual intellectually. The causes of individual differences enumerated by him are sex, remote ancestry, near ancestry, maturity and environment. Now, maturity includes the functioning of the various bodily organs, including the glands ; so that we find that the organic factor is predominant in his enumeration also. What the original equipment does, even in such a simple matter as colour preference in babyhood, has been shown by Preyer and

Baldwin. If one had the patience, one would have found that no two babies had the same biography, and that, inspite of close similarity in environmental influences, children would grow up differently. It is only broadly then that we have a psychology of childhood just as it is only broadly that we have a psychology of adult life. Constant subjection to the same environmental influences may have an obscuring effect upon the differences of personality, the more so when the individuals are not children but grown-up men who are expected to conform to a (social) regulation pattern by curbing some of their original tendencies and atrophying them by disuse. The proportion of original to acquired tendencies is much greater in childhood than in adolescence and maturity, and the similarities of childhood are the similarities of organic needs, impulses and reactions. We draw out differential mental abilities in children by putting them in different situations, physical and mental, and thus nurture supplies those differential stimuli which, acting on an original constitution, feed or starve innate capacities and lay the foundations of the future personality. In the development of that personality social conventions and social ideals have a great part to play, for it is only as a freak that the growing individual can hope to develop in a way unforeseen and undesired by the society at large and play the rôle of a reformer of social ideals and social morals. It is the type that has the greatest chance to survive, and in society, no less than in the world of life, mutation is a rare phenomenon. It is, then, inspite of our societies, that we become geniuses and heroes,—society has a levelling tendency and a smothering effect upon differential development. The Superman is not wanted in society and that is why he is so late in coming. Society has a dread of the uncommon, for it does not know how to deal with it. It wants manageable members and uniform behaviour-pattern. The science of psychology would have been far more difficult to formulate had society agreed to let individuals have their

own proper environment as stimulus. What the potentialities of growth are, we are now coming to realise in a small way in the new schools based on differential psychology. Just imagine what the results would have been, had Society had a Dalton Plan or even a Project Method for its growing members. Of course, we know also what it means to allow every member opportunity to develop according to his own genius. The limitations are not only of means but also of ability. It is not always that you can hope to get a teacher for every single individual, and many a Hellen Keller is leading the life of an idiot simply because the sympathetic and able teacher is not forthcoming.

Before we leave the subject of individual instruction, let us pay the due meed of praise to those who have discovered the way to approach every individual mind so that its potentialities should not run to seed. The mentally deficient is now a lesser drag on the communities in many lands because it has been discovered that the body can learn and remember where the intellect fails. Ribot had indeed drawn attention to that fact and in recent literature the names of Hering and Semon are familiar to all psychologists in that connection, but to put this knowledge to practical use has been the work of teachers and social workers. We have now schools to teach the mentally deficient many useful arts that gain a livelihood, and it may be, if there be any truth in Baldwin's theory that righthandedness quickens the brain, that the more the mentally deficient person works, the more dexterous does he become by the dawning of a new intelligence. The spread of vocational education may prove the salvation not only of the average man but also, where manual training preponderates, the emancipation of many a slumbering brain. We have nothing to do here with raising the dignity of labour in the eyes of the people ; we are concerned here only with the psychological effect of manual training on a section of society on whom intellectual education is sheer waste of time and

energy. The rise of Industrial Psychology is really a continuation of the work of rousing social conscience to the need of non-academic education and of directing men's attention to the actual facts of social life; incidentally, it is a revelation of the differential equipment of minds and the possibility of utilising it for social purposes. We are on the threshold of discovering a new caste-system based not upon heredity but upon natural equipment. If we can at any time find out the character-types in terms of various mental functions, in terms of imagery, emotion and reaction, and can further show how far such types breed true, we shall be solving one of the obscurest problems of psychology and biology alike. But at present it would be presumptuous to say that we have discovered the types in their infinite subdivisions ; all that we can affirm is that probably Jung's psychological types are as near as what we want for social dealings. After all, it is with a certain end in view that we classify men, and, seeing that the persons found in society are not yet known to be unique syntheses of certain qualities, we are satisfied as soon as we know enough about them to distinguish them from the rest of their class. It does not pay to study a single individual intensively, and it may be remembered to our profit that such study we owe to those who, like Preyer and Baldwin, were prompted by paternal affection, or those who, like Freud and other psychoanalysists, originally got the wages of their labour. It is only latterly that the study of children and social misfits has assumed a certain amount of disinterestedness and, I may add, become the pleasant occupation of incompetent dilettanti at the same time. But the risk notwithstanding, it is desirable that we should know exactly what the science of psychology professes to discuss, for we are likely to run away with the notion that it deals with the stereo-typed because it is a science. Not at all ; it is with the average that it deals and not even with the average of a homogeneous group.

If to-day we are so grateful to Binet and Simon for their pioneer work in the measurement of intelligence, it is because they drew pointed attention to the differences among children inspite of similarity in chronological age. Their technique has been modified and improved and we are now in possession of better appliances for the measurement of difference, but their researches opened up a vista that is not yet closed. It is yet a moot point as to what exactly the measurement of intelligence measures, for the term 'intelligence' covers a wide variety of mental functions; but it has been able to show that wide individual differences occur and that, although for convenience we form manageable groups, that does not take away from the fact that we are differently equipped for the battles of life. If we start with the assumption that not what we are but what we are expected to be matters in education, we shall be ignoring the warning of Rousseau, Pestalozzi and Froebel that a child is not a miniature adult and that education is not so much an instruction as an opportunity. We must develop according to our own genius if we are to attain the full stature of our personality, not only as a race but also as individuals. The new educational movements are primarily meant to give every child an opportunity to develop through work and play as a living growth and not as an industrial manufacture where the patent stamp of the architect is too palpable and too oppressive. Froebel, Montessori, Burk, Parkhurst and others have launched systems of individual instruction in keeping with individual psychology, and although in many less known experiments the sole motive is to do some thing new, some have proved their stability by increased output of work and the more congenial occupation of school-children. If any one is interested in the subject of individual instruction, he will find in the second volume of the Twenty-fourth Yearbook of the National Society for the Study of Education sufficient materials to inform and impress him. He will also see the difficulties in the way of teachers,

for it may be taken as an axiomatic truth that easy education for children means labour and intelligence for teachers. The ferrule and the rod a teacher can use effectively as a weapon of punishment but seldom as an instrument of instruction; the new methods of instruction demand people who would teach lessons not with their hand but with their brain. You will have to pay such teachers, and pay them quite decently, so that all their energy may be reserved for evolving improvements in their technique. ociety will have to be reminded of the old saying that unless you pay your teachers better than you pay your jockeys your horses would be better trained than your children, and nowhere, except in the country of the Houyhnhnms, is that a desirable consummation. People must rise to the consciousness that education is a social duty and that we pay for our neighbours' childrens' education because we want our own children to have a better social surrounding. There is too much of dull uniformity in our educational systems, and unless we are prepared to shoulder the financial burden of individual instruction in the community and help each child to find an individual outlet for his innate and acquired capacities, let us not complain if we have so few geniuses in the country.

We have observed before that society has a levelling effect and that the social mill has a tendency to turn out uniform products. But we do not thereby deny that differential outfit has its own effect on the resulting growth. It is upon a given constitution that society has to act, and that constitution is determined ultimately by ancestral and ontogenetic factors. We have more accurate knowledge of the broad reactions of the body and mind, such as reflex, instinctive and emotional adjustments, but the finer shades of difference are all peculiar to the individuals and, in respect of them, the science of Psychology has to remain satisfied with generalisations that are approximate and knowledge that is uncertain. Even the original constitution, after years of reaction

and adjustment, comes to get into a habit and thus a peculiarity springs up in course of time and establishes a character for the individual. Not only individual lifehistory, but the racial history too, as Jung points out. This racial history, while it fixes the similarity of the members of a race, serves at the same time to distinguish them from members of other races. This racial unconscious, whether as organic outfit or as instinctive equipment or as mental impression, gives the characteristic outlook upon life and provides the basis of national and racial psychology. But, far deeper than these racial factors, there are other factors that are generic and hark back to the times when man was learning the craft of intelligence in competition with animals and laying the foundations of that rational behaviour which subsequently raised him above the beasts and made him the crown and glory of the living creation. Deeper than these even, there are factors that ally him to the beasts, which, even after centuries of civilisation, surprise him at unexpected moments by surging up out of the vasty deep of his mental constitution and remind him that the beast in him has not been completely laid and that the tiger and the lamb lie together in the ambushes of his mind and make a curious fraternity. But are there deeper elements than these even? Is man carrying in him also the vestiges of the plant and the stone out of which the Evolutionists would fain make him rise? The torpor of plants in which Bergson believes, is evident in the constitution of idiots and the temporary stupidity of even the most refined intellects on certain occasions; while the instinct of death, which Metschnikoff believes to a normal reaction of old age, Freud believes to be due to the desire of the individual to sink back into the dust out of which life originally arose.

What a complex constitution man is carrying within his slender frame! There is an affinity with the whole of creation in respect of this or that aspect of his nature, and he

is a bold man indeed who would say that he has been able to fathom the depths of personality in any individual case. Man is inscrutable both in his constitution and in his growth. This is why complacent predictions about him turn out to be so frequently false. When we study him as a member of the human species we run away with the notion that we can deal with him as the sample of a class, just as we do in Chemistry and Physics. He is the representative of his class in a general sense in respect of his organic outfit, *i.e.*, in respect of just those things which only touch the fringe of the science of Psychology. He is in a looser sense the representative of a class is respect of certain generic unconscious and racial factors which come into view in certain fundamental reactions connected with hunger and sex,—in certain instinctive reactions, and, following upon them, as McDougall points out, in certain emotional adjustments of a fundamental character. But he is not the representative of a class when we take his entire biography into account—the whole of happenings in that particular spatio-temporal tube, as Russell would say. That invisible factor which lays down the basis of difference, *viz.*, Memory, acts as a dividing gulf between him and his neighbour in certain peculiar ways. James, Bergson and Russell have all treated this point with consummate ability, and although the ultimate form in which this memory is supposed to act is not identical with the Unconscious of Freud, we may for practical purposes admit that the latent impressions of past experience bring about an intellectual interpretation and an emotional outlook which are peculiar to each individual and gives his personality a characteristic stamp. We have in recent years witnessed the publication of many researches on individual mental functions, but the most important, because the most concrete, investigations have been on the reactions of men as social beings. Man is being studied not only in his individual capacity but also as a member of a society and is being judged in respect of

intelligence and normality with reference to a particular social setting. There is scarcely any faculty of his that is not being tested of late to find out how far he conforms to the social standard. His imagination, his reason, his emotional outfit and even his sense of the ludicrous are being systematically investigated, and practical use is being made in some countries of this knowledge regarding him. He is being studied as the member of a crowd, as a combatant, as a peaceful citizen and as an abnormal individual. The rise of Social psychology and Individual psychology is a welcome sign that man is becoming an object of increasing interest to his fellow-men, not as an abstract being but as a creature of flesh and blood. He is becoming personal as an object and not an impersonal item of psychological treatment. Both as a child and as an adult he is being watched and his course of development followed with interest and anxiety.

One word more and I am finished. The rise of the individualistic way of studying man has been in recent years due to one man more than to anybody else, I mean Sigmund Freud. Jung and Adler have improved the method in some matters, but we owe to Freud the beginning of this new study and its recognition in the academic circle. His investigations have made us aware of the pitfalls of the personality in childhood and youth and have explained, more satisfactorily than before, many of the obscure traits of individual lives. He has drawn pointed attention to what environment can do and what a large part the instincts incidental to each age plays in the development of normal personality. Neuroses, psycho-neuroses and psychoses are now within prospect of being explained and treated as diseases of abnormal adjustment, and although opprobrium and hate have fallen to his share, the social conscience has been roused to many crying evils and a changed attitude towards the misfits of society is slowly coming on. Minds are no doubt being regarded as single cases requiring individual treatment, but they are being

brought under control according to ascertainable laws; and thus the science of psychology which originally fought shy of the Unconscious as an impalpable realm of the mind is now recognising it as the dynamic background of conscious personality and as an welcome explanation of overt mental reactions. We now realise what strange ways the mind has of conserving its experiences and utilising them in subsequent conduct. The alienist and the educationist are gradually making an alliance and the social reformer is not oblivious of the results of their combined labour when dealing with his special problems, just as he is not oblivious of the biological investigations regarding the transmission of acquired characters. If normal life depends on normal reaction and normal reaction on normal environment and adequate opportunity, it becomes at once a social duty to provide the environment that will call forth the appropriate reaction of the age of the subject. Where home-life does not supply the necessary environment for proper growth, the school steps in, especially in the cases of those whose home is modelled on the needs of the adult members only. The large use of women in lower classes of boys' schools, not only in the West but in the East as well, is meant to impart that homely touch to the instruction of children which the mother alone is expected to impart. At that age the normal environment is the affectionate care of the mother, and it is this that the woman teacher is expected to supply. In some systems the nursery is simulated, and in large industrial centres, where the mother has to labour for the bread of the family, such a nursery is an indispensable adjunct to every factory and every workshop. The eternal question of finance stands in the way in every such social venture, but finance has to be found somehow, for after all it is man that is the ultimate end of all social endeavour and money is meant to fill society with the largest number of desirable citizens. Till social obligation is raised to the status of paramountcy, the problem of education will never be solved.

With education conducted on right lines and providing opportunities for all there is the prospect of a new orientation in social gradation and social development. Without it the wheel of social progress will be constantly clogged and the friction will produce heat in the social system. We must once and for all abandon the idea that mind is an abstract principle loosely related to the body and to society and that, as such, it may be grown to any dimensions. The reading of psychology does not justify that attitude. It is only abstractly that we are all equal and the child is the adult in miniature. The truth is that we differ and that education is the opportunity given to bridge as much as possible the gap of difference. Not however in the uniform pattern of machine-turned articles, but as organic factors of a vital system in which the parts are sufficiently alike to belong to the same system and yet sufficiently different to fulfil different needs. In this noble endeavour one fact is to be guarded against, and that is the confirmation of the class prejudice that believes in the transmission of acquired abilities through untold generations. Communal and class pride has based itself on the assumption that opportunity is of very little avail in the regeneration of the down-trodden. Let us accept unpleasant facts up to their legitimate limits and prevent the neurotic, the insane, and the idiot from multiplying. But let us not create limits where there are none, and throw obstacles in the way of the social regeneration of the down-trodden by denying to nurture its legitimate share in the uplifting of the mass.

We started with the question whether Psychology is a science in any sense. Define human life in terms of reaction to environment and you will have a science in some sense. But if you start with an adult constitution, you will very soon despair of getting into scientific field. The difference between man and man is more than the difference among the isotopes of chemical elements, and the scope of uniformity is very limited so far as the conscious reactions are concerned. But

below the level of the conscious and the individual there are factors that knit man to man as against the brute creation and as one community or race against another. It is the purpose of the psychologist to expose the basis of difference, and even though each man may be proved to be a law unto himself, the purpose of psychology will be served if it can show that it is within the competence of society to control social development within limits and to bring about a rapprochement among its members. Let us accept the difference that we find, but let us all work towards the smoothing of racial, social and communal edges. We shall never probably succeed in eliminating all differences nor is that the object of psychology as an applied science. But let us all live for the day when the differences will be minimised to their lowest point, and when men fail to agree they will understand the obstacles at work and pay mutual respect to each other's feelings. The best is not to differ and the next best is to know why we differ. Let there be equal opportunities for all according to their social and individual constitution and let it not be said that partiality warped the sense of social obligation in any individual or any community; and in order to take the first step towards that rightful consummation, let us all turn first of all to those whom we have hitherto neglected.

The Psychopathic Child[1]—a plea for an application of the Mnemic theory.

BY

MAJOR OWEN BERKELEY-HILL, M.A., M.D., I.M.S.

In no century previous to the present one, has there ever been so great and so widespread an interest in psychology. Human character and behaviour are being analysed and studied in respect to standards of mental health. Social problems, individual, communal and racial, are being examined and explained in terms of mental qualities. This awakening of public interest in matters that have been for long the object of deep concern to alienists, brings to persons like myself, not only an agreeable feeling that at least some serious attention is being paid to problems with which he has long been familiar, but also a grave sense of responsibility as to the part he may be called upon to take in respect to their future development.

The importance of combining psychological with physiological considerations has been recently emphasised in a very interesting publication by R. G. Gordon. In his opinion many children are nervous because of a want of due proportion between their innate tendencies. It is true that we cannot estimate the proportions of the various elements with any precision; nevertheless we may recognise in the psychopathic child, behaviour which depends on combinations of these, which is not precisely similar to the behaviour induced by similar combinations in the so-called normal child. In

[1] Read at the Indian Science Congress, Psychological Section—abstract prepared by the board of editors.

criticising the analysis by McDougall of the more complex emotions, Lloyd Morgan points out that perhaps not enough stress has been laid on the *emergent* quality of the resulting combination of these simpler factors. This conception of emergence is one which is likely to be of great service to psychology. It is not enough to analyse the factors operating in the various functions met with throughout the universe. We have to postulate some new quality which emerges as a result of the combination. For example, McDougall states that the emotion of awe is made up of fear, self-abasement and curiosity but leaves out of account the new quality which emerges from the combination of these primary emotions. No doubt self-abasement, curiosity and fear do go to make up awe, but awe is not just a mixture of these; it has a quality of its own which belongs to none of them. Further, it by no means follows that a mixture of these ingredients will always produce awe.

In the integrations of the simpler mental patterns into the more complex, sometimes one emotion is more prominent, sometimes another. Gordon cites the case of a typically nervous child who was endowed with strong curiosity. She was always prying into forbidden subjects, especially sex. Being also very timid she would do nothing that threatened herself. She also shewed self-abasement and could not keep up with other children. In spite of her possession of the three ingredients considered by McDougall as essential for the production of awe, she had no trace of it and was, on the contrary, rather aggressive. It might be said that there was no development of awe because there was no integration of the simpler emotions. On the other hand, there was an integration but the end product was not awe but a sort of shyness.

Following Gordon's plan we may not turn from the psychological aspect of the psychopathic child to consider him from an anatomical and a physiological standpoint. This

brings us back to the basal unit of the reflex arc, which is built up and integrated at higher and higher levels. As it is impossible to observe a mental process going on in a neurone, the best that can be done is to form a theory to explain the facts. Gordon considers the mnemic theory of Semon to be admirably suited to our purpose. Semon conceives certain dispositions to be laid down in the germ cell and in the bodily structure of the individual. As a result these dispositions, which he calls engrams, development and behaviour tend to follow certain definite lines They are, however, capable of modification. The greater the multiplicity and complexity of the neurones, the greater will be the potential modifications of engrams and the greater the elasticity of behaviour. Obviously it is in the human being that such potentialities reach their maximum, but modification of engrams and the correlated elasticity of behaviour are quite useless unless integration is possible into composite groups of engrams whose correlated behaviour is adapted to the needs of the individual in relation to the environment. It is in just this respect that the nervous child fails.

Recently Bianchi has shewn that the frontal lobes have the control of the emotional reactions or instinctive dispositions. We may therefore presume that the psychopathic child has something wrong with his frontal lobes. That this defect is not a gross one is obvious, for the nervous child is not lacking in capacity, and frequently "grows out" of his nervousness. Hence the defect is not one of a deficiency in frontal neurones but a failure in integration. We are now confronted with the question why should these frontal neurones fail in their function to exert control over the rest? Gordon thinks that in certain cases, such as the congenital psychasthenics described by Janet, there is something inherent which prevents integration. What it is, we have not the slightest idea. In other cases nutritive deficiencies, lack of

vitamines, etc., seem to be responsible, for when these are remedied improvement occurs. Various poisons and infective agencies are frequently the causes and among the most prominent are those of syphilis and encephalitis. But perhaps the most important of all the etiological factors is environment.

Perception of Form by Passive Touch [1]

BY

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Külpe in his 'Outlines of Psychology' regrets that there has been no thorough examination of the space idea. "There are" he says, "certain factors which have hardly received any direct attention, while theories have been propounded which are valid only for one quite definite aspect or characteristic of the whole process." One of the neglected problems is that of "the possibility of the inter-comparison of the spatial character of perception." It has been tacitly assumed that such an inter-comparison, the comparison of the space perceived by one sense with that perceived by another, is possible. For this reason there is a tendency among the psychologists to regard spatial relations and not spatial attributes as the crux of the space problem. As a consequence there has been, according to Külpe, "an almost total neglect of the perception of extension and figure and almost exclusive regard of the perception of distance and position." (Out lines of Psychology, p. 337.) The problem taken up in this paper, therefore, is a neglected problem and it is true to-day as it was when Külpe wrote the lines in his third edition in 1909.

But the question has yet another significance. The inter-comparison of space attributes mentioned above is an

[1] Read before the Section of Psychology, Indian Science Congress, at Benares, January, 1925. The paper was prepared under the direction of Dr. N. N. SenGupta.

extremely time-worn problem. Locke advanced the view that extension and figure "make perceivable impressions both on the eyes and touch and we can receive and convey into our minds the ideas of the extension and figure of bodies both by seeing and feeling." (Locke on 'Human Understanding,' Chapters V and XIII.) Berkeley on the other hand insists upon the relativity of the space factors. Diderot is of opinion that the space sense of the blind is entirely different from that of sighted person thereby supporting the view that the tactual perception of forms and shapes upon which the blind man generally relies is different from that of visual perception.

The problem that we have sought to test here is calculated to throw light on both of the issues mentioned above. In the first place we shall try to understand how far the space attribute of shape or figure can be directly perceived without the intermediary of space relations. In the second place our experiment, we believe, would show a method, a proximate if not an ultimate method, of solving the question of possibility of intercomparison between spaces of different senses.

(II)

The problem of this experiment is to test the capacity of a number of subjects for discrimination of shapes by means of passive touch. The materials chosen were wooden blocks shaped into circles, triangles and rectangles having equal areas and approximately the same weight. There were two sizes of blocks. The part of the body chosen for experiment was the fore-arm. The time of application was kept approximately constant at two seconds. The experiments were divided into series each consisting of fifteen applications with rest in between in order to eliminate the disturbing factors such as after-images. Three series were taken for any subject on a single day.

The procedure of the experiment was to take one of the shapes for the standard and the others as variables. The standard was always applied first and no attempt was made to eliminate the time-error. The variables were applied irregularly but with a view to ensure five applications of each in any one series. The subject was called upon to give a judgment simply in terms of identity or difference. When neither of these could be given the answer was entered as doubtful. Introspection was recorded of each subject after each application. Proper rest was given between applications and between series. The experiments were conducted usually in the college hours between eleven and four.

The experiments fall into two parts, an earlier one and a later. The earlier experiments were performed in the year 1920 and 1921. The later ones have been performed by ourselves during the present college year. The paper is based upon the results of both of these sets of experiments. There have been all told thirteen subjects in the experiments, six in the earlier series and seven in the later. With one exception the subjects are all post-graduate students in experimental psychology. We have a record of eleven hundred and eighty-five experiments altogether; five hundred and ten for the earlier and six hundred and seventy five for the later one.

The instruction to the subject was that he should try to judge whether the second stimulus is the same as or different from the first. He should not try to guess or visualise. His sole attempt should be to report exactly what he tactually experiences. Any factor other than the tactual is to be regarded as secondary. The secondary factors should be reported if they appear inspite of the instruction.

(III)

(1) One of the most noticeable features of these experiments is that the subject relies very largely and involuntarily

TABLE I.

	Number of total Presentations.	Number of secondary aids.	Percentage of Secondary aids.
Earlier Series.			
Subject 1	135	102	75·5%
„ 2	135	96	71·1%
„ 3	105	85	80·9%
„ 4	45	24	53·3%
„ 5	45	30	66·6%
„ 6	45	32	71·1%
Later series.			
Subject 1	225	174	77·3%
„ 2	135	111	82·2%
„ 3	90	81	90·0%
„ 4	90	68	75·5%
„ 5	45	36	80·0%
„ 6	45	29	64·4%
„ 7	45	30	66·6%
Total ...	1175	898	76·4%

upon the secondary factors. The percentage of these to the total number of answers, as the Table I shows, varies from 53 to 90%. This indicates how far our actual perceptions are habitually obscured by visual and other factors. The

number of answers in terms of touch alone is insignificantly small. It is probably for this reason that the upholders of fusion theory like Wundt and Lipps ascribed all spatial perceptions to a fusion between the touch and the vision or kinaesthesis. The high percentage also shows how careful we ought to be in conducting experiments on the tactual sense; for inspite of the instruction such a large number of trained subjects failed to eliminate the secondary factors.

The secondary factors that contribute such a large share in the perception form usually belong to three principal categories. In the first place there is the inevitable visual image that arises almost reflexly along with the tactual impressions. (The problem of their share in tactual space perception is familiar to all students of the psychology of space.) In the second place there are the secondary dermal factors of differences in temperature, in size and in weight. Most of these perceptions are to the best of our knowledge of an illusory character. For the temperature of the blocks was practically the same, and the area being the same there was hardly any reason for perceiving a difference in size. But the difference in size might be due to the displacement of the figures which would attract attention to only one of the sides of a figure. This would naturally lead to its overestimation.

A natural suggestion arises in this connection. May not this attention factor be a principal determinant of the perception of form? A form is constituted of a member of geometrical characteristics which must be apprehended in quick succession in order that we may have the perception of the total form. In the case of the tacto-motor perception where we are clearly aware of form the different configurations arise one after another in quick succession, thus yielding the comprehension of the shape or form. The same thing probably holds true of vision; for the visual organ too is a mobile organ. Perception of form in that case would result

TABLE II.

Character of the secondary factors.

A. Visual factors--
   (*i*) After-image.
   (*ii*) Occulo-motor Sensation.
B. Dermal factors—
   (*i*) Difference in temperature.
   (*ii*) Difference in Weight.
   (*iii*) Difference in size.
   (*iv*) Difference in position.
C. Pure guess factors.

from a combination of the different spatial features successively brought into relief through attention. It would follow, if our suppositions were correct, that there would be no clear perception of form in passive touch. For all the geometrical features are given all at once and there is no chance for attention to move from one phase to another. Some sort of perception of geometrical characters arises as soon as attention may be brought into play with respect to any particular phase. We mention this here as a mere suggestion which we may follow up in further studies along this line. In the third place the non-tactual judgments of shape are very often pure guesses. We have not been able to analyse what these are based upon and whether or not these could be subsumed under the other categories mentioned. It would have been better if we could have determined the exact rôle of each of these secondary aids. For their number suggests that their contribution to our normal perception of form is not insignificant. But our problem in this experiment is negative in relation to them. We have tried to find out not what we perceive with their help but what we perceive without them.

(2) The total number of correct and incorrect answers after the elimination of secondary factors constitutes only 10 to 47 per cent. of the total number of presentations. The ratio between correct and incorrect answers is of extremely doubtful significance. In several cases the number of correct answers is slightly larger than that of incorrect ones. As

TABLE III.

		Total number of presentations.	Correct answer.	Incorrect answer.	Ratio between correct and incorrect answers. Corr. : incorr.	
Earlier series.						
	Subject 1	135	17	16	1·06	approx.
	„ 2	135	22	17	1·3	„
	„ 3	105	6	14	·43	„
	„ 4	45	9	12	·75	„
	„ 5	45	10	5	2·0	„
	„ 6	45	8	5	1 6	„
Later series						
	Subject 1	225	29	32	·9	approx.
	„ 2	135	4	20	·2	„
	„ 3	90	7	2	3·5	„
	„ 4	90	9	13	·7	„
	„ 5	45	5	4	1·25	„
	„ 6	45	9	7	1·3	„
	„ 7	45	3	12	·25	„

the Table 3 will show the ratios of those cases are, in the earlier series, 1·06, 1·3, 2 and 1·6, and in the later series 3·5, 1·25, and 1·2. In the remaining six cases however the number of incorrect answers predominates. In these cases the ratios are in the earlier series, ·43 and ·75, and in the later series, ·9, ·2, ·7 and ·25. The number of subjects predominates in the case of correct answers, but the divergence is greater in those cases where the number of incorrect answer is larger. It is impossible to conclude from such data how far forms can be perceived merely in terms of passive touch. Or we might put the issue in a different way. There is no evidence, we may say, to show that we directly perceive forms in terms of touch without any aid from secondary factors.

(IV)

The questions that were raised in the very beginning may now be answered in the light of these experiments. Since the data do not point to any definite direction regarding the perception of form, but since at the same time it is clearly seen that the secondary factors inevitably arise, we can but say that it is more convenient to explain the perception of form in terms of inter-relation of different factors rather than as underived attributes so far as touch is concerned. With respect to the second problem as to whether there can be an inter-comparison of the tactual and visual perception of figure and shape we can point out that the visual perception of shape is unequivocal. The amount of error or doubtful answers is relatively small. In the case of touch the discrimination is undoubtedly equivocal. For, the number of guesses far predominates over the number of direct perceptions. And even in the latter case direct perceptual discrimination as we have seen is of doubtful significance. Hence the question of inter-comparison can rise only in the universe of discourse of conceptual analysis. In the realm

of concrete perception the difference is obvious. Our conclusions clearely apply only to passive touch. It is well-known that the blind have recourse to the tactual impressions for the discrimination of shapes and figures. But we all know that in those cases touch is invariably operative along with movement. Thus Dr. Javal says, "a blind person, however well trained in reading, is not always able to decipher a letter of the Braille type by passing his finger on it. In order that the points and their grouping may be easily recognised the finger has to be rubbed over them" ('Blind Man's World,' p. 13). The perception in that case is clearly tacto-motor and is outside the scope of this enquiry.

Measurement of Difference

K. B. MADHAVA, M.A., A.I.A. (LOND.),

University of Mysore

The measurement of difference—material or Psychophysical—is essentially a quantitative problem of Statistics. The data may be collected in any manner so long as their homogeneity and reliability are secured, but the analysis is of necessity specialised and variable according to the circumstances of the case. An attempt was made by one investigator in a paper contributed to this section at the last session, of measuring differences in general intelligence and ability of appreciating absurdities, among subjects belonging to different communities, with a view to study communal differences. Apart from the material, the method of analysis was there confined to comparing only the extent of the range of distribution in frequency groups of the scores and of the modal positions of such distributions. It is apparent that that analysis is very meagre and inconclusive, if it does not actually yield even unreliable results. A comprehensive scientific analysis would include (1) not only the comparison of the central tendencies and of the measures of dispersion and of other statistical constants, but should take into account (2) their differing variabilities and their entire Lorenz distribution of aggregate subjects and their aggregate scores. Besides, (3) on the basis of random sampling, the data should be treated as a problem in the contingency of association after the elimination of the component due to chance, (4) the goodness of fit of the two distributions in the two alternate characters to be compared should be quantitatively determined, and if necessary even under certain assumption, (5) the amount of correlation between the two traits, say scores, which are easily measureable and the community

which however can only be given in a Biserial form or in alternate characters should be ascertained. If possible (6) the threshold limens in the two cases may also be determined under one or another hypothesis. These are powerful and scientifically precise tests and even then they suggest or indicate only any differences that are constitutional to the two differing universes. The real position however is a shifting one complicated by various other external attributes some capable and others incapable of precise measurement and a powerful statistique or technic is of great avail.

In the paper the two universes between which comparisons are made are the two communities (1) Brahmin and (2) all the Rest in respect of their scores in English and other subjects in the Entrance Examination of selected years of the Mysore University; and these are analysed in great detail so as to determine the statistical constants under the six heads stated above. Suitable diagrams are drawn so as to illustrate the differences analysed. Certain conclusions suggested by the analysis of the present sets of data are discussed.

Summary of results :—

Communal differences in scores in University Examinations.

Year and Description of Universe.	Mean.	Standard Devn.	Variability.	Lorens co-ordinates.	After elimination of chance.		Pearson's Goodness of Fit.	Sheppals $\frac{x-\bar{x}}{\sigma} = z$	Biserial Correlation r.
					Contingency.	Contingency.			
				0 10 20 30 40 50 60 70 80 90 100					
1921 S_1 English... Brahmin 407	35·22	8·160	23·44	0 26·2 49·0 69·0 85·9 100					
				13·9 37·6 59·1 77·4 93·9	·1185	·381	·6127	−·0386	+·0260
All the Rest 84	35·60	7·295	20·49	0 25·6 48·0 67·8 85·7 100					
				13·1 36 8 58·1 77·2 93·7					
H_1 English... Brahmin 242	33·88	8·406	24·81	0 25·9 49·5 70·2 87·3 100					
				13·6 37·6 60·2 79·0 94 7	·1615	·0635	·3727	+·1667	−·1434
All the Rest 103	32·62	8·031	24 62	0 26·0 49·3 69·2 87·2 100					
				13·8 38·3 59·9 78·4 94·8					
1924 S_1 English... Brahmin 502	34·29	9·559	27·88	0 27·5 50·8 71·1 87·9 100					
				14·4 39·1 61·4 80·0 94·9	·1431	·0420	·0071	+·1642	−·1193
All the Rest 132	32·32	9·382	29·04	0 27·8 51 4 71·4 88·0 100					
				14·9 40·2 62·1 80·3 94·5					

S_1 Optionals... Brahmins	502	41·45	13·687	33·02			.....			}	·1171	·0366	·3546	+·1558	−·1132
All the Rest	132	38·83	11·267	29·01			.....								
H_1 English... Brahmin	285	35·25	8·181	23·04	0	26·3	49·0	69·6	86·6	100	}				
					13·3	37·6	59·7	78·1	93·7						
All the Rest	150	33·68	8·329	24·74	0	26·4	49·7	69·5	87·0	100	}	·1660	·0600	·1404	+·1282	−·1209
					14·3	38·3	60·1	78·4	94·4						
H_1 Optionals... Brahmin	285	35·53	10·855	30·55			.....			}	·1838	·0811	·0440	+·1887	−·1767
All the Rest	150	34·58	8·097	33·42			.....								
1923 H_1 English ... Brahmin	247	...	...	...			.....				...	...	...	...	−·117
All the Rest	142	...	...	...			.....				...	...	...	...	...
H_1 Optionals... Brahmin	247	...	...	...			.....				...	...	...	...	−·128
All the Rest	142	...	...	...			.....					...	...	...	...
1922 S_1 English ... Brahmin	...	...	...	...			.....				...	...	...	...	−·125
All the Rest	...	...	...	...			.....				...	...	...	...	...
S_1 Optionals ... Brahmin	...	...	...	...			.....				...	...	...	...	−·133
All the Rest	...	...	...	...			.....				...	...	...	...	...
H_1 English ... Brahmin	...	...	...	...			.....				...	...	...	...	−·124
All the Rest	...	...	...	...			.....				...	...	...	...	...
H_1 Optionals... Brahmin	...	...	...	...			.....				...	...	...	...	−·061
All the Rest	...	...	...	...			.....				...	...	...	...	...

Mental Work in Isolation and in Group

N. N. SENGUPTA, M.A., PH.D., AND C. P. N. SINHA, M.A.

Social psychology is no longer confined to casual observation and speculation. For many years there has been a growing tendency in this field to rely upon well devised experiments. At least one particular problem, namely that of quantitative estimate of the influence of the group upon the individual, has been taken up by more than one worker in psychology. Social psychology thus is coming within the purview of the laboratory psychology. The reports of Allport's experiment in the Journal of Experimental Psychology as well as in his volume on 'Social Psychology' are valuable contributions to experimental social psychology. The present paper can thus claim no originality in the line of work taken up. Nor can it claim anything remarkable in the result obtained. The only justification for this paper lies in certain improvements in the method of experiments. Very few of the investigations hitherto reported have taken the work of subjects at a level of practised efficiency. The usual procedure is to calculate the score of an individual's work alone, and then to put the individual in a group and to evaluate his output. The fluctuations due to increase in practice are not properly emphasized. Thus for instance in Allport's work reported in the Journal of Experimental Psychology (Vol. III, No. III, p. 113) there is hardly any realisation of the fact that the practised efficiency can be attained after a great many repetitions. "It was decided," says Allport, "to use fairly frequent alterations of the conditions T and A, thus equalising the effects of practice." It would be interesting to know how the stabilising effect of practice could be equalised and what that equalisation could mean.

The procedure adopted in this paper was to develop a level of practised efficiency so that there would be but little fluctuation in the output of work from day to day. Five subjects co-operated in the experiments. All of them are trained in laboratory work in psychology. The experiments were conducted during the present academic year. Every subject was led through eighteen practice experiments spread over a fortnight. Each subject in this part of the experiment worked alone. After eighteen trials all the subjects were put together. Four such tests were employed. The period covered was one week.

The method employed was that of cancellation. The same column taken from a number of copies of a daily paper was given to each subject and he was asked to cancel all 'a's and 'e's for a period of three minutes. Similar material was used in the case of work in group. Time was regulated with a stop-watch.

Results:

(1) Table I shows the output of each individual from day to day when he worked alone and when he was placed in a group. The figures indicate a stage of practised efficiency towards the end of the period of practice experiments. The record of the work in group shows a large and sudden rise from the level of practised efficiency.

(2) Table II shows the gain in percentage over the previous day's work. The work of the individual, when alone, shows the characteristic features of a practice curve. There is a large increase at the outset of fifteen or sixteen per cent. followed by a decrease that goes down to 1·7 to 2·1 per cent. When placed in the group the same individuals show an increase of 14 to 23 per cent. over the level of practised efficiency. There is only one subject who fails to show any marked increase in the output of work.

TABLE I.

Date.	Subj. 1's Output.	Subj. 2's Output.	Subj. 3's Output.	Subj 4's Output.	Subj. 5's Output.
		In isolation.			
20-11-25	148	177	189	163	220
24-11-25	153, 177, 181	190, 206, 218	204, 205, 220	166, 195, 178	202, 212, 221
25-11-25	199—	212, 231	221—	197—	...
26-11-25	176, 185, 203	...	215, 217, 232	193, 206, 210	207, 227, 239
28-11-25	198, 218, 214	235, 213, 210	216, 234, 230	...	241, 259, 234
30-11-25	208—	234, 222	233, 234	222—	240, 248
1-12-25	218, 206	235, 220	228—	216, 195	...
3-12-25	219, 210	221, 234	231, 233	224, 231	...
4-12-25	200, 210	230, 238	238, 236	233, 233	...
		In group.			
4-12-25	249, 255	272, 283	261, 280	272, 273	...
[illegible]	256	273	286	270	251
11-12-25	244	272	294	267	252

TABLE II.

Gain in percentage over previous day's work.

Subject No.	Days.											
	In isolation.									In group.		
	1	2	3	4	5	6	7	8	9	10	11	12
I	...	15%	17%	-5·5%	11·1%	0%	2·0%	0%	−4%	23%	0%	0%
II	...	16%	8%	0%	2·0%	0%	2·0%	...	...	18%	−1%	0%
III	...	11%	5 5%	0%	3·0%	3·0%	-2·5%	2·2%	1·7%	14%	6%	2·8%
IV	...	9·5%	10·5%	0%	5·5%	5·5%	−7%	11%	2%	17%	0%	1%
V	...	5·5%	...	5·0%	9%	0%	...	...	...	...	3%	...

Remarks:—

The group is believed to affect the individual in opposite ways of facilitation and inhibition of activities. The facilitating factors are essentially two:

(*a*) Facilitation of movement by perception or idea of movement in others.

(*b*) Emulation and rivalry.

We have not found any inhibiting influence working on any of our subjects. Facilitation, too, does not seem in these experiments to have been brought about through the intermediary of emotion. The amount of emotion that trained workers would experience in one another's company and in the performance of a task known to all as laboratory tests is negligible.

We should suggest that the increase is due to the attentional factor. Myers says, "A paradoxical result may be sometimes obtained for a short time, the subject being more attentive and executing a prescribed task more rapidly in the presence of, than in the absence of, such a distracting presentation. That is to say, the strain necessary to avoid disturbance directly leads to increase in the degree of attention given to the task prescribed." This increased attention that produces a greater vividness of the task at hand leads to its more efficient execution. The downward course of the work-curve after a few trials can also be explained in this manner.

In regard to perception or idea of movement we should suggest a little variation of the hypothesis. Movement of each individual operates as a signal for others to act. Thus there need not be any conscious realisation of the work of others. The set idea that one has to keep on as long as others work, along with the actual perception of the movement, leads to the continuance of activity. But in every group we perceive the movement not of one but of several persons. Thus the frequency of perceptions which acts as stimuli increases with the number. Consequently the responses to

these stimuli increase in frequency and there is a greater output of work. When the individual fails to keep up with this frequently recurring stimuli, there is bewilderment and inhibition. In other words the perceptual factor of the group influences the individual as a frequently recurring signal does.

Notes and Abstracts

British Journal of Psychology, 1925.

(Medical Section)

Vol. V.

Part I.

On Consciousness by Charles S. Myers. The author maintains that as matter is now becoming to be regarded as a manifestation of electric forces, a product of activities, it is not undesirable to regard mind as a product of activities, for when we come to consider the difference between mind and *living* matter, the distinction is reduced almost to vanishing point. Consciousness may be regarded as the co-ordinator of all the past and present experiences of the organism so as to give direction to the selection of its future activities and environment, in compliance with the organism's sanctions and ends.

Freud's Group Psychology by William McDougall. This contribution is intended to be a criticism of Freud's "Group Psychology and the Analysis of the Ego." Professor McDougall interprets Freud's group psychology to be based upon suggestion and that this suggestion depends upon a peculiar emotional attitude which is the outcome of the re-animation (by regression) of an atavistic survival, *i.e.*, an attitude acquired by the race during the long period in which men lived in the primal horde, a horde dominated by a brutal horde-leader fiercely jealous of his sexual rights over all females. McDougall rejects this theory of Freud as "not

proven and wildly improbable." He points out that it leaves the leaderless group unexplained and quite untouched the fact that women are at least as suggestible as men. It does not explain the primary fact of the contagion of emotion nor how a leader attains leadership, nor, having attained it how he forces regression upon his followers to maintain his leadership.

Part II.

The Neural Sub-strata of Reflective Thought by George G. Campion. In the course of the ontogenetic life process there has gradually been formed in response to the life-long aggregation of the effects of sensory impulses a huge and complicated network of physiological paths in which are enmeshed innumerable neurones in various parts of the cerebral organs. These physiological paths were termed by Semon "engrammic systems" and by Head and Holmes neural "schemata." Along these huge system of paths, partly as the result of fresh sensory stimuli, neural impulses are being continually propagated now in one part of the system, now in another; that a neural impulse activating one part of the system tends to activate both adjacent and subjacent parts; that those parts which are in a sufficient state of activity tend to throw above the threshold of consciousness their psychological correlates; and that the part of the system which is at any moment most active owing to the intensity of its neural potential is the part which forms the neural correlate of the psychological abstraction which introspective psychologists and even at times behaviourists call the "focus of attention."

A Method of Self-Analysis by E. Pickworth Farrow. The writer invented this method of self-analysis while undergoing psycho-analysis from two analysts. He claims to have employed it successively to cure himself of the effects of a large number of repression and complexes. The method

consists mainly in writing down one's own thoughts systematically. He claims two advantages of his system over that of ordinary psycho-analysts. First, persons who might be shy of telling their most intimate thoughts to another person need have no anxiety about writing them down for his own reading. Another advantage is that the person undergoing self-analysis is free from the indiosyncracies of particular individual analysts. Also the results obtained by self-analysis are always free from the criticism that the analysts always read the results into the mind of his patient.

Part III.

The Conception of Sexuality by Drs. J. A. Radfield, James Glover and Alexander Shand. A Symposium.

Dr. Hadfield maintains that sex differs from erotic in that it emphasises the whole conative as well as the sensuous element; it differs from libido in that while the latter may refer to all pleasurable cravings, sex refers to those only whose natural end is reproduction; it differs from love in that it is the activity of only one instinct (of several components it is true), whereas love is an activity of the whole personality. Dr. James Glover objects to Dr. Hadfield's attempts to effect a strict delimination of the term sexual by applying a simple teleological criterion, *i.e.*, of subsurving reproduction. He holds that such an attitude would be very misleading for the investigation of the instinctual components of Man's sexual life. Mr. Shand contends that the "onus probandi" rests on those who would, like Dr. Glover, extend the connotation of "sexual" in unexpected and *a priori* directions. What, he asks, becomes of the theory of the "libido" as belonging to all erotogenic zones if it only belongs to them in some persons?

O. B. H.

Zeilschrift far die gesamte Neurologie and Psychiatrie

(Vols. XCVI, XCVII, XCVIII, XCIX), 1925.

VOL. XCVI.

M. Müller. Die Dauernarkose mit Somnifen in der Psychiatrie. (*Prolonged Narcosis by the use of Somnifen in Psychiatry.*)

The author reviews the whole question of treating certain forms of mental disorders—Nanic-depressive insanity, mania, melancholia, and epilepsy—by prolonged narcosis through somnifen. This form of treatment was introduced by Klasi. The author considers that the principle of treating certain mental diseases by prolonged narcosis is quite sound but he doubts whether somnifen has proved to be the best drug for the purpose. The mortality in this treatment is so far 5%.

H. Kogerer. Psychotherapie and Psychesen. Psychotherapy and Psychoses.

The author enumerates all the methods practised at present for treating the psychoses. He discusses institutional *versus* extra-institutional treatment. He illustrates his advocacy of avoiding if possible the admission of mental cases into hospitals on the ground that such admission is liable to increase the psychic trauma, with twenty clinical reports of cases treated without admission into a hospital. He maintains that paranoiacs and even schizophrenics, are very liable to severe exacerbation of their malady through admission into a hospital.

VOL. XCVII.

S. Fischer. Die Intelligenz und ihre Prüfung bei leichien Schwachsinnformen. (*Intelligence-testing in cases of mild weak-mindedness.*)

This is a very interesting article which will repay study by both psychologists and psychiatrists. The author starts

with a discussion as to the nature of intelligence. The object of the present research was to formulate a scheme whereby disturbances of intelligence can be measured as far as possible quantitively. The method employed has been devised to suit the requirements of pedagogues as well as of psychiatrists. The tests were applied only to persons who had received the same type of educational training, *i.e.*, the Volksschule. Each person tested an I. Q. of nine years or over. The test comprised a series of five examinations. The first was devised to test the capacity for abstract thought; the second dealt with definitions; the third in combinations of ideas; the fourth tests together abstract thought and relationships; the fifth is a test of the critical faculty.

Vol. XCVIII.

M. Astwazaturow. Zur Lehre von der Entstehung der Rechtshändigkeit. (*A Study in the origin of Right-handedness.*)

The author considers that right-handedness arises solely from the superior development of the left side of the brain. The universal tendency to handle objects with the right hand is due to the fact that convolutions of the left cerebral hemisphere receive and store impressions better than do the convolutions of the right cerebral hemisphere. In human evolution speech was first a matter of gesticulations and to make such the right hand was used more than the left. Later when these gesticulations came to be associated with emotional exclamations, by the law of neurobiotaxis the innervation of speech and right-handedness developed together in the left hemisphere. Then the development of writing and drawing with the right hand tended still further to increase the development of the left hemisphere through secondary association. As subsidiary factors towards a still

greater strengthening of the association may be cited imitation and training. The author believes that left-handedness is more widespread in the historical period of man's history than was the case in the prehistorical period, while ambidexterity, on the other hand, was more common in prehistoric times than it is to-day.

Hans W. Maisr. Zum gegenwärtigen Stand der Frage der Kastration und Sterilisation aus psychiatrischer Indikationen. (*Present Views on Castration and Sterilisation for psychiatrical reasons.*)

The author recommends sterilisation for cases which fall into the four following categories :

(1) Castration should be carried out as a last resort on men who are given to commit serious sexual offences and for whose treatment every other measure has failed and provided such men are suffering from only mild forms of psychic disorder. Men who suffer from grave mental defect and are serious sexual offenders should be interned in an institution. This operation need not be made compulsory by law but should be undertaken with the consent of the person so afflicted.

(2) Castration of insane women. Cases in which there is recurrent excitement at the menstrual period.

(3) Castration of temperamentally abnormal women in the interest of race hygiene.

(4) Sterilisation of psychically abnormal men. This procedure is even more desirable in the interest of race hygiene than in the case of women.

The author does not advocate at present any legal sanction or compulsion. He thinks that the introduction of any law on this subject would only lead to the performance of a larger number of these operations than is necessary and end in a strong revulsion of public opinion against any such form of treatment.

Fr. von Rohden. Uber Beziehungen zwischen Konstitution und Rasse. (*On the Relationship between Race and Constitution.*)

The authoress considers that there appears to be some superficial correspondence between racial physical characteristics and constitutional make-up. Nevertheless she maintains that racial characteristics are based on anatomical and anthropological considerations while constitution is a clinico-biological entity. Racial characteristics are the outward appearance while constitution is the capacity to react. The fate of a people is not decided by their racial characteristics but by their mental constitution. In the matter of disease it is the constitutional factors that count for they form the ground in which the germs of disease grow. Moreover it is the constitution with its disposition towards disease that is hereditary. Hence Dementia Praecox is not more common among the races of Northern Europe than among races in other parts. Dementia Praecox is more prevalent among persons of a certain constitution, *i.e.*, the asthenic or athletic. Similarly, it is not among the races of Eastern Europe that there exists a greater tendency to Manic-depressive and cyclothymic psychoses, but among persons of below the average physical development. In short the disposition to certain types of psychoses is not peculiar to certain races but to certain types of constitutional make-up.

Vol. XCIX.

E. Trömmer. Selbstverstummelung und Selbstbeschadigung. (*Self-mutilation and Self-injury.*)

A very interesting series of cases of self-injury. The author considers that all self-inflicted injuries, including the swallowing of foreign bodies, indicate the existence of latent or manifest hysteria. He regards the motives for such

behaviour as multifarious and sometimes very strange. Nearly all are associated with sexual abnormalities of some sort.

O. B. H.

The Australasian Journal of Psychology and Philosophy, Vol. III, Nos. 1-4, 1925.

The Machine and the Worker by S. Wyatt.

The paper considers the psychological problems in the adjustment of the worker to the machine. (1) There is at the present day, a discrepancy between the design of the machine and the physical characteristics of the worker who controls it. The psychophysical characteristics of the worker are not adequately considered in designing the machine with respect to its general contone, the height of the working place, accessibility of controls, the strength necessary for working the controls, and the direction of movement required in the control. (2) Speed is another factor in the relation between the worker and the machine. If the speed of the machine were set to coincide with the slowest rate of working of the operative, the pace could be maintained with comparative ease. (3) Again, the machine simplifies movements and imposes a uniformity and regularity on the worker. The repetitive nature of the work induces monotony and its accompanying psychological effects. It has long been known that the worker subjectively introduces variety in his work. The modern problem of industrial psychology is to relieve monotony by means of objective conditions.

The Present Status of Psychology by A. H. Martin, M.A., Ph.D.

There has been a marked growth in the popular demand for Psychology as is shown by the increase in the number of classes in that subject under the auspices of the University

Tutorial Association of the British Empire. In Canada the increase amounts to 20 per cent. In U.S.A., a similar state of affairs exists. In Australia and New Zealand too, a satisfactory beginning has been made in this direction. A number of Universities have commenced laboratory work and the Victoria University College, Wellington, teaches Psychology as an independent Science.

The University of New Zealand recognises Psychology as a subject for the advanced B.A. course and B.A course with Honours.

The following table shows the increase in the number of Psychological laboratories per decade:

Decade.		Number of Laboratories established.
1880-1890	...	3
1890-1900	...	17
1900-1910	...	20
1910-1919	...	22

The Australasian Association of Philosophy and Psychology passed the following resolution at its annual meeting, at Melbourne:

"That this meeting records its strong belief that the status of Psychology in Australasian Universities should be raised, in particular by the additional provision for teaching and Experimental research."

Other articles of interest are: *Some Psychological Tests applied to Engineering Workshop Apprentices* by A. H. Martin, B. C. Doig and R. Simmat. *Behaviour in the Light of Modern Biological Research* by R. Simmat. *The Psychological Examination of the Immigrant* by A. H. Martin. *The National Institute of Industrial Psychology* by G. H. Miles. *Freud's Psychoanalytic Theory of the Taboos of the Dead* by R. F. A. Hoernte.

Professor Madison Bently writes in the American Journal of Psychology, January, 1926 :

" Notable progress in the development of laboratories for psychology in the Far East is indicated by the following bit of information. It appears that many of the Eastern Universities have been coming to America since the War for psychological equipment as well as for 'testing' supplies. Among them are the University of Calcutta (Dr. N. N. Sengupta); Maharaja's College, Mysore (Dr. M. V. Gopalaswami); Dacca University (H. D. Bhattacharjee); Brahmavidyashrama ("School of Universal Knowledge"), Adyar, Madras; National University of Kwangtung, Canton China (Dr. Hishing Wong); Teachers' College, Wuchang (Professor F. B. Cheng); Fuh Tan University, Shanghai (which has recently built a psychological laboratory for Dr. Zing Yang Kuo, formerly of the University of California); Peking Government Teachers' College (Professor Y. C. Chang); Amoy University (Dr. C. H Chou); National South-eastern University, Nanking (Dr. C. W. Luh); National University of Peking (Dr. T. T. Lew); Amoy University; Kyoto Imperial University, Japan; College of Commerce, Nagoya (Professor Y. Kaga); and Tokyo School for Mental Deficiency (Dr. R. Ishii).

Industrial applications are well on the way, at least in Japan. It is reported that a Department of Psychology is maintained in one of the spinning centers, and the "Institute for Science of Labor" at Kurasiki, has just now published a report, which includes a bibliography of about twenty Japanese references and recites four years' work of the six departments of the Institute.—The Japanese Journal of Psychology (published in Japanese) is now in its third year. It has published a number of experimental articles."

N.N.S.

Psychological Monographs No. 156 (1925).

RELATION OF THE RATE OF RESPONSE TO INTELLIGENCE BY J. A. HIGHSMITH, PH.D., PROFESSOR OF PSYCHOLOGY, NORTH CAROLINA COLLEGE FOR WOMEN.

Published by Psychological Review Co., U. S. A.

The purpose of this study is to investigate the relation of rate of response to general intelligence? To what

extent is intelligence a question of rate of response? The development of many of the tests as measures of intelligence and as measures of abilities in various special lines has apparently proceeded upon the assumption that test scores made under definite time limits are not seriously influenced by that fact. This is specially true in the field of intelligence tests. This tendency to extreme simplification of mental testing through increased emphasis upon the rate of response, that is through taking as a measure of intelligence the number of exercises an individual can do correctly in a definite length of time is most explicitly brought out in a recent revision of the Benet-Simon scale. The author is therefore entitled to thanks from students of Scientific Psychology for tackling the problem. The research seems to be one carried out with patience and care. But the smallness of the number of subjects on which the experiments were conducted leaves one in some hesitation to accept the findings before further work and corroboration in the hands of other workers. The conclusions are as follows:

"1. The results of this investigation indicate decidedly that the rate of response to test material is by no means a safe measure of intelligence.

2. They indicate, also, that the National intelligence test is a much better measure of rate of response than it is of intelligence.

3. The simple linguistic rate tests used in this study are about as good a measure of intelligence as is the National intelligence test.

4. Rate in linguistic material can be measured much more consistently by a short test than rate in non-linguistic material.

5. The non-linguistic rate tests, when added to the national, contribute slightly more to the correlations with the criterion than does the linguistic rate.

6. The high correlation between rate tests and the national intelligence test points to a danger in employing the composite of group tests as a criterion by which the validity of a new group test is tested. It may be that this process is increasing the importance of the rate element in group tests at the expense of factors more significant of general intelligence."

There is every chance that the thesis will be proved to the credit of Prof. Highsmith. The findings are well worth the serious consideration of those who are carried away by the fad of intelligence tests.

M. N. B.

Psychological Monographs, Vol. XXIV, No. 8.

Further Studies in Retroactive Inhibition, by E. B. Skaggs.

"If any given mental activity B, following a previous learning process A, works detrimentally upon the retention and recall of learning A, we do note the fact by saying that there has been retroactive inhibition." Reconstruction of chessmen on the chess board, learning of sense and nonsense syllables, paired association, etc., were used as methods of testing. The author finds that retroaction occurs in most of the methods used. A period of rest interpolated between learning and recall causes but little retroaction. Work, similarly interpolated, has a marked retroactive influence. But if the work be of a nature similar to that of the original material there is no inhibition. The author finds the temporal position of the work as of importance in regard to retroaction as against the view of Robinson (Psycho. Monograph, XXVII, 1920).

N. N. S.

The International Journal of Psychoanalysis, Vol. VI, 1925.

Mother-right and the Sexual Ignorance of Savages by Ernest Jones.

The author puts forward the view that the institution of mother-right owes its origin in the desire to deflect the

hatred towards the father felt by the growing boy. The disliked and feared attributes of the father are absorbed by the maternal uncle who is made the father imago. Jones considers the system of mother-right, with its avuncular complex, represents one mode of defence among the many that have been adopted against the tendencies denoted by the term Oedipus-complex. It is not possible to say that it represents a necessary stage in the evolution towards the present patriarchical system. Jones sees no reason why it should, and the fact that some of the lowest type of Australian savages, whose primitive instincts are hard enough to curb, find it possible to cope with them by an alternative method—that of taboo and the totemic system—might be quoted in support of the doubt. Nor is there any reason to suppose that the savage ignorance, or rather repression, of the facts of paternal procreation is a necessary accompaniment of mother-right, though it is evident that it must be a valuable support to the motives discussed above which led to the instituting of mother-right.

Some Unconscious Factors in the International Language Movement with especial referenee to Esperanto.

By J. C. Fluegel.

Fluegel maintains that the dynamic factors underlying the international language movement are to be found in certain unconscious mental mechanisms with which psychoanalysis has made us familiar. These unconscious mechanisms are exceedingly complex in nature and in function. Not only do they belong to a variety of developmental levels (the allo-erotic, the genital autoerotic and the anal-erotic), but at each level there are ambivalencies prompting to behaviour in different, often in contrary, directions; the ultimate attitude of any individual towards the international language movement resulting thus from the interplay of

many different factors, all of them normally outside the individual's power of intellectual appreciation or voluntary control. These mechanisms are, moreover, operative in one way or another, whatever be the relation of the individual to the movement. Their influence is traced in the inventors of languages, in leaders of propaganda, in the rank and file of those who adopt and use an international language and in outsiders who merely come across the employment or advocacy of such a language.

Hindu-Muslim Unity by O. Berkeley-Hill. Berkeley-Hill suggests that the cause of the over-determination which he sees in the feud between Hindus and Muslim, can be traced to two main sources, namely, a Mother-land complex and Cow to-tem-worship. He tries to show how widespread is the mother-feeling among Hindus for the land of India, and, following the example of Ernest Jones, suggests that as with the English in Ireland so with the Muslim in India, we have a case of "rape." He discusses the question of the cow having once been the principal totem animal in India with its consequent implications of taboo. In cow-killing, the Muslim have roused the ambivalent feelings associated with taboo and so created a second source of hostility against themselves.

Psycho-analysis of Sexual Habits by S. Ferenczi. In this contribution Ferenczi gives in more detail certain "active" procedures hitherto only touched upon in general terms in previous publications. By adducing certain characteristic examples from his own practice he shows how these measures may meet with success. Ferenczi emphasises that the procedure he advocates must not be utilised in any way to supersede the established psycho-analytic technique. The aim and end of psycho-analytic therapy now, as always, is to bring about a mobilisation of the repressed in the pre-conscious system by means of re-awakened memories and of reconstructions arrived at by necessity. He makes some

interesting reflections on the meta-psychology of habits in general based on Freud's theory of repetition-compulsion.

Negation by Sigmund Freud. Freud calls attention to the fact that the subject-matter of a repressed image or thought can make its way into consciousness on condition that it is *denied.* Negation is a way of taking into account what is repressed. A negative judgment is the intellectual substitute for repression. The "negativism" displayed by some psychotics is probably to be regarded as a sign of " defusion " of instincts due to the withdrawal of the libidinal components. This view of negation is considered by Freud to harmonise very well with the fact that in analysis we never discover a "No" in the unconscious, and that a recognition of the unconscious on the part of the ego is expressed in a negative formula.

O. B. H.

Journal of Mental Science, Vol. LXXI, 1925.

" The Malarial Treatment of General Paralysis," by Dr. G. DeM. Rudolf.

In this report Dr. Rudolf records observations made on 31 cases, 16 females and 15 males. The cases were watched for periods varying from $2\frac{1}{2}$ to 14 months after the cessation of the rigors. The same strain of benign tertian parasite (*P. vivax*) was used throughout. All inoculations were made subcutaneously. Dr. Rudolf observes that some patients improve physically but not mentally, while others change from maniacs to simple dements. Others again improved so much both physically and mentally that they were able to be discharged to the care of their friends or relatives. In every case so treated there was physical improvement. Marked mental improvement only occurred in cases with short histories.

"Observations on Delinquent Mental Dejectives," by Dr. W. Rees Thomas and Dr. Cecil H. G. Gostwick.

This paper records observations carried out on 400 patients in the Rampton State Institution, for mental defectives who display tendencies of a dangerous and violent character. The cases were grouped into three categories:

1. Simple Mental Defectives.
2. Mental Defectives with abnormal emotional instability.
3. Mental Defectives with psychoses or psychoneuroses.

The authors do not discuss the relative importance of mental disorder and mental deficiency in determining anti-social conduct. Nevertheless they point out that it is not always possible nor even desirable to neglect the importance of psychical disturbances and thus to imply that the congenital mental deficiency alone is the determining cause of criminal conduct in mental defectives.

"The Methods of Psychotherapy," by Dr. Frederick Dillon.

The author holds that there are only three main types of psychotherapy: (1) Suggestion: (2) Re-education: (3) Psychoanalysis. He deplores the want of unification in our knowledge of mental pathology and treatment. On account of the fact that at present psychotherapeutic practice has split into so many divergent schools, it not infrequently happens that the advice given to a patient by different physicians is not only conflicting but actually contradictory. Different forms of therapy are called for in different types of patient. The author considers that it is quite possible to produce a neurosis or even a psychosis in the healthiest individual free from neurotic antecedents provided the environmental strain is sufficiently prolonged and intense.

"*Occupational Therapy*"—*A Series of papers read at a Meeting of the Scottish Division held at Glasgow in May, 1925.*

Dr. D. K. Henderson holds that although occupational therapy is by no means the only form of treatment for mental disease, it is a very valuable one. He believes that many recoveries are hastened by it and by it many improvements are effected. Good habits are substituted for bad ones, physical and mental deterioration are retarded, and life is made more endurable for the great bulk of chronic cases. Dr. A. G. W. Thomson emphasises the importance of variety in therapeutic occupations. He also stresses the necessity of keeping well in the foreground the idea of therapy. The function of an occupational department is therapy first last and all the time. Miss Brodie advocates in a short contribution the advantages of recompensing by payment or in kind, patients for the work done by them in the course of their treatment. Miss Dorothea Robertson describes various kinds of work suitable for the therapy of mental patients. She recommends strongly the employment of Occupational Therapy prescriptions made out for each patient by the medical officer in charge of the case.

"*The Case of Richard Loeb and Nathan Leopold*," *by Dr. M. Hamblin Smith and Dr. Anne Fairweather.*

This article is a summary of the extraordinary murder case which aroused widespread excitement in America in 1924. The authors conclude that it is impossible to regard either of the two young men who were jointly concerned with the murder of a fourteen-year old boy, the son of Mr. Jacob Franks, a wealthy resident of Chicago as other than abnormal. The case will stand for ever prominent in medico-legal annals. These two young psychopathic criminals were sentenced to penal servitude for life with a further technical sentence of 99 years for kidnapping. The authors hope that

the future mental condition of both youths will be subjected to careful study in the interests of psychopathology.

" Epilepsy : A Clinico-pathological Study of Fifty Cases," by Lt.-Col. J. R. Lord, M.B.

The author holds that the epileptic seizure is the manifestation of a cerebral explosion of organised brain function and not a chaotic and haphazard explosion of cerebral matter. The neurons would appear to be associated during the fit in the same fashion as they are in the normal state.

" The Boarding-Out System in Scotland," by Dr. George Gibson.

This is a valuable contribution to the whole question of extra-institutional treatment of mental patients. Dr. Gibson is a strong advocate of this type of treatment. Besides its therapeutic and humanitarian advantages, he thinks that there is nothing so efficacious for the education of public opinion in matters pertaining to lunacy.

" The Interpretation of some Sexual Offences," by Dr. W. Norwood East.

The author thinking that although the majority of sexual offenders are mentally deranged to an extent to render them liable to be dealt by courts according to the provisions of the Lunacy and Mental Deficiency Acts, the majority are held to be legally responsible. He gives some highly suggestive interpretations of the type of reaction which culminates in or is associated with, a sexual offence.

" The Investigation of Some of the Causes of Insanity," by Sir Frederick Mott, F.R.S.

A comprehensive survey of the principal etiological points in the causation of mental disorders. Sir Frederick Mott urges the promotion of research in the biological, social and

psychological causes of mental disease, with a view to prevention; and the furthering of the application of the principles of general medicine, including psychotherapy to the cure or alleviation of mental disorders.

"*Delinquency*," by *Dr. W. A. Potts.*

Dr. Potts holds that a sense of inferiority is an important factor in many cases of delinquency. In many cases of juvenile delinquency the problem is the parents. Intellectual defect is not so common as was formerly supposed to be the case with juvenile criminals.

"*The Psychopathic Personality*," by *Dr. M. Hamblin Smith.*

Abnormalities of conduct arise from a psychogenic basis. Adhesion to epiphenomenalism has proved bankrupt. Only comprehension of the psychology of the production of mental abnormalities can enable us to afford help. It is a matter of the utmost importance whether we regard these cases from a psychological or a physiological aspect, for if the mental abnormality is due to some unknown physical cause, we cannot even hope to deal with it until such time as this becomes known. If, on the other hand, we look at the problem in psychological terms, we can study the psychological abnormalities in relation to other psychological abnormalities.

"*Institutional Treatment of Mental Defectives*," by *Dr. A. M. McCutcheon.*

The types of defectives needing institutional treatment may be enumerated as:

(A) Children:

(1) High-grade cases who have been conduct problems outside or who are markedly unstable and those who come from very bad homes.

(2) Epilecptic and physically defective children.

(3) The lowest grade children, imbeciles and idiots, many of whom are custodial cases.

(B) Adults:

(1) The high-grade conduct case, those displaying marked instability and those with bad homes.

(2) Medium grade defectives, such as the lower grade of feeble-minded and the higher grade of imbeciles. Such cases may be taught trades with a view to discharge to ordinary life or to guardianship.

(3) Epileptic and physically-defective persons.

(4) Lowest grade imbeciles and idiots.

The objects of treatment should be:

(1) To correct their antisocial conduct.

(2) To develop their self-respect.

(3) To teach them various kinds of work for which they are best fitted.

(4) To prevent the procreation of children.

Q.B.H.

The Meeting of the Section of Psychology of the Indian Science Congress at Bombay.

The Section of Psychology of the Indian Science Congress met at the University Hall, Bombay in the first week of January, 1926 under the Presidency of Mr. H. D. Bhattacharjee of the University of Dacca. The Universities of Calcutta, Dacca and Mysore, the D. H. Training College of Calcutta, and the Mental Hospital at Ranchi were represented by delegates. The representatives of the local colleges also attended. Twenty-four papers were read and discussed. A list of the papers is given below :—

1.	A Sphygmographic Study of Brain Fatigue ...	Principal D. N. Sen, B. N. College, Bankipur
2.	The Influence of Environment on the Education of Children ...	Professor J. M. Sen, D. H. Training College, Calcutta.
3.	An Evaluation of the Results of Teaching Efforts in Bengal ...	Prof. M. R. Mitra, Training College, Dacca.
4.	Biological Conception of Libido ...	Mr. K. C. Mookerjee, University of Dacca.
5.	Measurement of Difference ...	Prof. K. B. Madhava, Mysore.
6.	Experiments conducted at the Teachers' Training College, Dacca	Prof. G. B. Bhattacharyya, Training College, Dacca.
7.	Cessation Stimuli in Reaction Experiments ...	Mr. K. C. Mookerjee, University of Dacca.
8.	Self-Government in High Schools ...	Prof. G. B. Bhattacharyya, Training College, Dacca.

9.	The Chance Factor in Intelligence Tests ...	Dr. M. V. Gopalaswami, Mysore, University of Mysore.
10.	The Laughter 'instinct' ...	Dr. M. V. Gopalaswami, University of Mysore.
11.	A Preliminary Report on some Experiments with White Rats on the Inheritance of Acquired Habits ...	Dr. M. V. Gopalaswami, University of Mysore.
12.	Effect of Mental Work as measured by Dynamometer ...	Mr. Manmathanath Banerjee, University of Calcutta.
13.	A Sand-motor ...	Dr. G. S. Bose, University of Calcutta.
14.	Mental Work in Isolation and in Group ...	Dr. N. N. Sengupta and C. P. N. Sinha, University of Calcutta.
15.	Effects of Practice in a Simple Psychophysical Work ...	Mr. Gopeswar Pal, University of Calcutta.
16.	An Experimental Study of definitely and indefinitely directed Attention ...	Dr. N. N. Sengupta and Mr. Sudhir K. Bose, University of Calcutta.
17.	A Report on the Time Adjustment of Hipp's Chronoscope ...	Mr. M. L. Ganguly, University of Calcutta.
18.	Studies in Involuntary Movements ...	Dr. N. N. Sengupta and Mr. M. N. Samanta, University of Calcutta.
19.	Factors in the Determination of the Differential Threshold of Active Pressure ...	Mr. M. N. Samanta, University of Calcutta.

20.	Individual Differences in the Memorisation of Nonsense Syllables ...	Mr. Haripada Maity, University of Calcutta.
21.	A Rreport on the Application of Intelligence Tests to College Under-graduates. ...	Mr. Haripada Maity, University of Calcutta.
22.	The Duration of Children's Attention ...	Dr. N. N. Sengupta, University of Calcutta.
23.	A Study of Imagery in the Works of Rabindra Nath Tagore ...	Dr. Sarasilal Sarkar, Civil Surgeon, Noakhali.
24.	Vocational Psychology with Special Reference to the Postal Service ...	Major Owen Berkeley-Hill M.A., M.D., I.M.S. Mental Hospital, Ranchi.

The Indian Psychological Association
First Annual Congress.

The annual Congress of the Indian Psychological Association was held at Bombay on January 5, at the University Hall under the presidency of Dr. N. N. Sengupta. The annual statement of accounts was discussed and passed. A resolution was adopted thanking the University of Calcutta for undertaking the publication of the Journal. A similar vote of thanks was passed for Mr. C. P. N. Singh, M.A., for his donation to the Association.

Major Berkeley-Hill urged that measures should be taken on behalf of the Association to enlighten the public opinion concerning the nature, progress and utility of scientific psychology. The idea was approved by the members. The president in his address rejoiced in the efforts that were being made at different Universities to apportion a more generous part to psychology. At the same time, he

pointed out that the forces of reaction were gathering strength. The main work of the Association would be to make the Journal, its first undertaking, a success. He also suggested that certain common schemes of work such as the discovery of certain norms or the standardisation and application of certain tests should be taken in hand at the different psychological laboratories.